PATENT SPECIFICATION

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COMPLETE SPECIFICATION

An Improved Radial-stream Purifying Canister for Submarine and Anti-gas Autorespirators

We, GUISEPPE CARDILE and EMILIO GARDIOL, both Italian subjects, trading as the firm I. A. C. SOCIETÀ PER L'INDUSTRIA ARTICOLI CAOUTCHOUC E PER MATERIALI PROTETTIVI ED ANTIGAS, of Tivoli, near Rome (Italy), do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to improvements in air inhalers for purifying exhaled air with perfect safety, both in submarine and anti-gas auto-respirators.

An oxylith regenerator has previously been proposed for use in a respirator, having a cylindrical container for the oxylith and in which the air stream is radial with respect to the container, the oxylith being contained between two finely perforated cylindrical, coaxial, substantially vertical walls. In this prior proposal however, the container is arranged outside the bag for the exhaled air.

According to the present invention however, we provide a purifying box or canister for auto-respirators for submarine and anti-gas use and comprisng two coaxial cylinders of metallic gauze, between which the chemical product for absorbing CO_2 is introduced, characterised by the fact that said cylinders are adapted to have their axes disposed horizontally in use, the air intake for the respiration tube is in communication with the inner cylinder of smaller diameter, and the cylindrical outer gauze is disposed within the " lung " or respirator bag.

The arrangement of the box or canister in the bag has the advantage that the distance between the chin and the bag is not greater than is the case with ordinary canisters, and it is possible to obtain the best pressure of air inside the bag, which is the pressure of water at the lungs' level in the case of submarine auto-respirators. Furthermore, the arrangement of the cylinders horizontally instead of vertically avoids the formation of a free space between the upper layers of the chemicals and the upper wall of the box, which space would be able to permit the passage of the whole of the air stream in both directions, thus causing the passage of unpurified air and the continuous increase in the percentage of CO_2 inside the bag.

Again the arrangement according to the invention allows the free movements of the head and chin of the wearer.

An example of embodiment of the invention is illustrated in the accompanying drawing, in which:

Figure 1 is a vertical axial section of a canister according to the invention applied to the rubber bag of a pendular auto-respirator (without valve). This section is drawn on the line C—D of Figure 2.

Figure 2 is a vertical section on line A—B of Figure 1.

Figure 3 is a front view of the canister.

The canister comprises a cylindrical metallic box 1, having its axis disposed horizontally and having a blank flat bottom 2 and cover 3. The canister is defined exteriorly by a perforated cylinder 4 which is lined inside with one or two very thin metal gauzes of the type used for holding soda-lime.

Concentric with cylinder 4 is an inner, generally cylindrical member 5 coaxial with the box and lined outside with a suitable gauze. The generatrix line of this member 5 is slightly concave towards its axis, as shown in Figure 1, so that said tube has the shape of a cask. A feeding tube 6 opens into the upper portion of the cylinder 4 and is provided with a shoulder 7 for attachment to an upper portion 8 of the rubber cloth respiration bag 9 which is apertured at this part. The edges of this aperture are gripped between the shoulder 7 and a washer 10 and tube 6 is closed by a stopper 12. An internally threaded collar 11 is provided for compressing the rubber between the parts 10 and 7, whereby this rubber forms, in effect a packing ring.

The circular cover 3 of the cylindrical box 1, is apertured at its centre and is provided at its outer edge with a groove corresponding to a similar groove provided in the edge of the box, and a rubber packing 13 is forcibly inserted in these

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opposing grooves and is compressed by the cover 3 by means of a screw nut 14. This latter is screwed externally over an outer screw-threaded end portion of the perforated tube 5, and bears on a central recess in the cover 3 through the intermediary of a sealing rubber packing 15. The cylinder 5 also has an inner screw-threaded end portion in the form of a sleeve and engaging with this is a nut 16 having its outer end formed as a spigot 18 to which is attached the corrugated tube 17. Leather packings 19, and 20 respectively, serve to seal the joint between the nut 16 and the recess in the sleeve connected to 5 and between this sleeve and nut 14.

Either by this or with any other known methods, the box 1 may be closed perfectly tightly after filling the space comprised between the two wire gauze cylinders 5 and 4 with a soda-lime mass 21.

The operation of the box or canister is obvious from the preceding description. In the pendular respiratory system illustrated, the stream of air follows alternately in two opposite directions the following path: corrugated tube 17, the perforated inner cylinder 5, the mass of soda-lime mass 21 and then through the gauze of the outer cylinder 4 into the bag 9.

It is obvious that when the respiration is of the bi-valve type, instead of the pendular type above described, the arrangement of the purifying box or canister remains the same, with the exception of the system for connecting the two corrugated tubes or the single two-way tube, which in this case replace or replaces the single corrugated tube, with the cover 3 of the box 1. In this latter case only one of the two tubes viz. the exhaling tube, will be connected, in the described manner, to the inner cylinder 5, while the other, or inhaling tube, will communicate directly with the inside of the bag 9.

As the stream containing a larger amount of CO_2 is the exhaled stream, whilst the layers of soda-lime which are initially traversed are those having a smaller area (smaller diameter), and coaxial with tube 5, there will be in these layers a considerably quicker saturation as compared with that obtaining in the outerlayers. Consequently, as the saturation of the layers gradually proceeds radially, the increase in cross-sectional area of the more effected layers, and the decrease in the total thickness of the more active chemical mass, produces a considerable improvement in the utilisation of the total absorbing power of the chemical product.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A purifying box or canister for auto-respirators for submarine and anti-gas use, and comprising two coaxial cylinders of metallic gauze, between which the chemical product for absorbing CO_2 is introduced, characterised by the fact that said cylinders are arranged to have their axes disposed horizontally in use, the air intake for the respiration tube is in communication with the inner cylinder of smaller diameter, and the cylindrical outer gauze is disposed within the "lung" or respiration bag.

2. A purifying box or canister according to claim 1, applied to a "pendular" or "bi-valve" auto-respirator, characterised by a cover for the box or canister, by a nozzle communicating with the inside of the inner cylinder and adapted for attachment to a tube serving as a breathing tube, by screw-threaded means for securing the end of the breathing tube to the said nozzle, these screw-threaded means being such that when the intake tube is connected up to the nozzle, the inner cylinder is sealed from the outer atmosphere, and by further means whereby the cover can be secured in fluid-tight fashion to a lateral wall of the box or canister and this wall is secured to the lung or bag also in a fluid-tight fashion.

3. A purifying box or canister according to claim 1 or 2, characterised by a feeding tube in the upper side of the box or canister for permitting the embedding of chemicals between the two horizontal and coaxial perforated cylinders.

4. A purifying box or canister substantially as herein described with reference to the annexed drawings.

Dated this 11th day of February, 1938.
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Fig: 1.

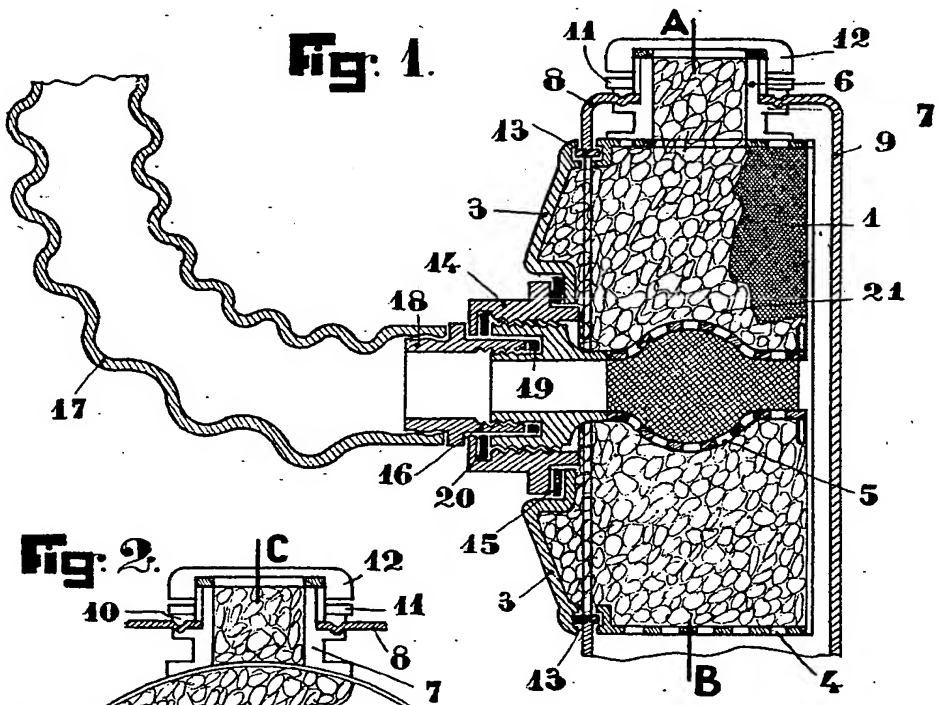


Fig: 2.

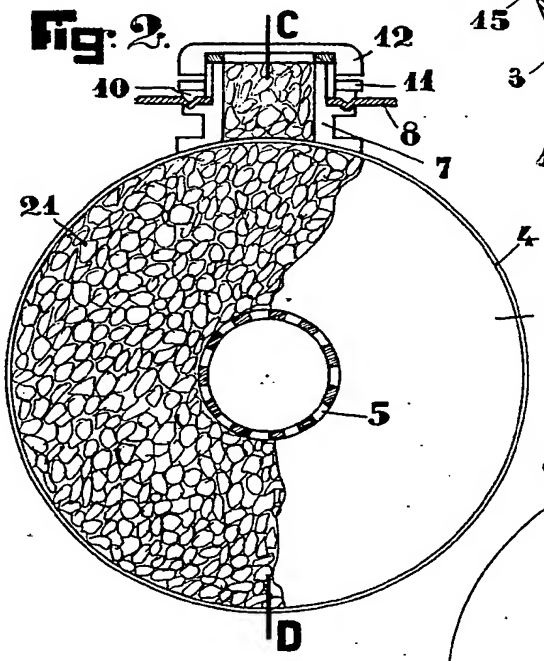
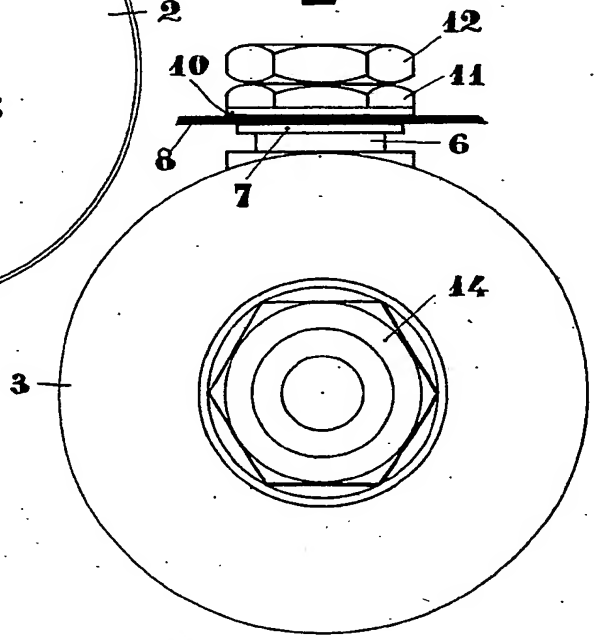


Fig: 3.



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